Lifting the Iron Curtain:

School-age Education and Entrepreneurial Intentions*

Oliver Falck[+], Robert Gold[*], Stephan Heblich[‡]

ABSTRACT

We exploit Germany's reunification to identify how school-age education affects entrepreneurial intentions. We look at university students in reunified Germany who were born before the Iron Curtain fell. During school age, all students in the West German control group received formal and informal education in a free-market economy, while East German students did or did not receive free-market education. Difference-in-differences estimations show that school-age education in a free-market economy increases entrepreneurial intentions. An event study supports the common-trends assumption. Results remain robust in matched samples and when we exploit within-student variation in occupational intentions to control for unobserved individual characteristics.

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[+] LMU Munich, Ifo Institute – Leibniz Institute for Economic Research at the University of Munich, and CESifo, Poschingerstr. 5, D-81679 Munich, Germany. Phone: +49 89 9224 1370, Email: falck@ifo.de.

[*] Kiel Institute for the World Economy, Kiellinie 66, D-24105 Kiel, Germany. Phone: +49 431 8814 412, Email: robert.gold@ifw-kiel.de.

‡ University of Bristol, CESifo, IZA and SERC, Department of Economics, 8 Woodland Road, Bristol, BS8 1TN, UK. Phone: +44 117 33 18234, Email: stephan.heblich@bristol.ac.uk.

1. Introduction

How does school-age education affect occupational choices? We address this question by investigating how German reunification affected the formation of entrepreneurial intentions. The reunification was a great systemic shock that generated a complete, swift and unexpected change in the institutional and economic framework. We exploit this shock as natural experiment on university students in reunified Germany who were born before the reunification. Students born in the socialist German Democratic Republic (GDR) experienced varying degrees of school-age education in two distinct economic systems, while students born in the Federal Republic of Germany (FRG) were only educated in a free-market economy.[1] This setup gives us the unique opportunity to analyze how formal and informal education in a free-market economy affects the formation of entrepreneurial intentions.

We choose to look at entrepreneurial intentions because the perception of entrepreneurship and private firm ownership as part of economic freedom is one of the most distinct differences between the two former regimes. Looking at university students, we focus on a group of individuals who are particularly qualified to start technology-oriented, innovative firms, with a high expected contribution to economic development (Shane, 2004). This growth prospect puts entrepreneurship in free-market economies high on the political agenda. By contrast, the GDR not only promoted dependent employment in state-owned companies over self-employment,[2] but also propagated through the state-controlled media the Marxist notion that entrepreneurs are expropriators who must be overthrown by the working class, taught it at school and exercised it in state-run youth organizations. With the reunification, East Germany instantaneously adopted the West German free-market system. Among other changes, this sudden turn came with significant adjustments in school-age education: socialist ideology was immediately dropped from school curricula, while the relevant extra-curricular activities in the socialist organizations for children (*Jungpioniere*) and youths (*Freie Deutsche Jugend*) came to an end. We consider this shock as an extreme case of a policy intervention useful to assess how policy can affect entrepreneurial intentions. Consequently, we interpret our estimations as upper-bound on the effect that any policy interventions during school-age could possibly have on the formation of entrepreneurial intentions.

[1] In our subsequent empirical analysis, we consider the German reunification as exogenous shock which changed the way students are being educated during school age. Our definition of school-age education covers all curricular and extra-curricular activities during school age that contribute to the formation of individual attitudes, preferences, and beliefs.

[2] The resulting lack of entrepreneurial activities is considered important in understanding the eventual failure of the socialist regime (Audretsch, 2007). Moreover, the lack of entrepreneurial tradition presents an impediment to the economic development of East Germany (Kuehn, 2014).

Our difference-in-differences estimations show that university students who were born in the GDR report significantly lower entrepreneurial intentions than university students who grew up in the FRG.[3] This finding applies to the average East German student in our sample, irrespective of whether she received some education in the free-market economy or not. However, East German students who finished school after reunification and experienced some free-market education show higher entrepreneurial intentions than East German students who finished school before reunification. The latter are 13.3 percentage points less likely to express entrepreneurial intentions than their West German counterparts. Those who were treated with some free-market education are on average only 2.9 percentage points less likely to express entrepreneurial intentions. The treatment makes up for 78% of the difference in entrepreneurial intentions between East and West German university students.

All our estimations take account of more general trends in entrepreneurial intentions by comparing students who studied at the same university, chose the same major, and lived the same number of years in reunified Germany. To assess the validity of the common trend assumption underlying the DiD approach, we perform an event study analysis that splits our sample into 2-year graduation cohorts from secondary school. Starting from 1983, the analysis shows no indication of pre-treatment effects while the effect increases persistently for cohorts who graduated after reunification in 1990. Additionally, we exploit the fact that we observe students who graduated from secondary school in different years but were surveyed in the same wave. This allows us to identify the effect of school-age education in a free-market economy conditional on East-German-specific time trends or East-German-specific age trends that absorb potentially confounding effects from changes in the economic and social environment. These East-specific trends also account for the fact that the share of East German high-school graduates going to university may have increased over time (Fuchs-Schündeln and Masella, 2015).

Robustness tests show that our results are not affected by the exclusion of selective subsamples (among them occupations that typically lead to self-employment) and matching on observables. We also exploit within-student variation in the attractiveness of entrepreneurship relative to other potential occupational alternatives to account for unobserved individual-level characteristics. All specifications support our main findings and suggest that we identify a plausibly causal effect of changes in formal and informal education during school-age on the formation of individual entrepreneurial intentions.

[3] Falck et al. (2011) report a similar effect of growing up in the GDR when investigating persistent differences in the entrepreneurial intentions of East and West German university students observed in the 1990s.

While we are looking at entrepreneurial intentions, policy-makers may be particularly interested in ways to stimulate entrepreneurial activity. If we agreed on this policy goal, evidence from Falck et al. (2012) would support using intentions to predict entrepreneurial activity. They employ the 1970 British Cohort Study to show that students who stated entrepreneurial intentions at age 16 have a significantly higher probability of being an entrepreneur at age 34 than students who did not. While it is reassuring to see that intentions translate into action, we would like to add a word of caution. A policy goal of merely increasing the number of entrepreneurs may be counterproductive if too many individuals with low entrepreneurial abilities give entrepreneurship a try. Instead, we believe that a more promising policy goal would be to increase the awareness of entrepreneurship as an occupational choice.

This paper connects to an established literature arguing that the collapse of the GDR came as a big surprise (Alesina and Fuchs-Schündeln, 2007; Fuchs-Schündeln, 2008; Redding and Sturm, 2008). Within a year of the fall of the Berlin Wall in November 1989, the GDR joined the FRG in October 1990. With this act of reunification, the GDR adopted the FRG's institutions fully. This had significant impacts on virtually all aspects of public life. State-owned enterprises were privatized, political competition was introduced, freedom of speech was guaranteed and the East German economy became fully integrated into the free-market economy of reunified Germany. We identify how this unexpected institutional change affected the formation of entrepreneurial intentions, focusing on individuals who experienced the reunification shock at school-age. We conclude that the quick transition of the socialist education system to the educational institutions of West Germany provides a plausible explanation why East German university students' entrepreneurial intentions converged with West German university students' entrepreneurial intentions. This links our paper to a broader literature on the long-run effects of socialist education (Fuchs-Schündeln and Masella, 2015; Brunello et al., 2012; Falck et al., 2011).

Our paper further links to the literature on behavioral effects of macroeconomic experiences. This literature shows that individual beliefs, attitudes, and aspirations depend on the cultural and political environment, and that these preferences may change as a result of significant macroeconomic shocks. Previous research shows that experiencing periods of recession or high inflation early in life increases risk-aversion and the preference for redistribution, while reducing the probability of participating in financial markets (Malmendier and Nagel, 2011; Malmendier and Nagel, 2013; Giuliano and Spilimbergo, 2014). Similarly, we show that a systemic shock experienced during school-age affects later entrepreneurial intentions. Our

findings further suggest that the timing of the shock plays a role. Children who experienced the reunification shock at an earlier point in their school-age education show stronger changes in their entrepreneurial intentions. This finding corroborates Alesina and Fuchs-Schündeln's (2007) conclusion that socialist attitudes do not disappear instantly but take generations to change. Our results suggest that school-age education can be a driver of this development.

Finally, our paper adds to the literature on the formation of entrepreneurial intentions. This well-established literature has looked at genetic factors (Nicolaou and Shane, 2011); parents and family (Lindquist et al., 2015; Fairlie and Robb, 2007); peer effects (Nanda and Sørensen, 2010; Lerner and Malmendier, 2014; Falck et al., 2012); entrepreneurship courses (Rosendahl Huber et al., 2014; Oosterbeck et al., 2011); and training measures (Karlan and Valdivia, 2011; Fairlie et al., 2015). We show that a sudden change in the institutional environment of school-age children affects the formation of entrepreneurial intentions. This is closely related to the literature on entrepreneurship education. This literature finds that entrepreneurship courses at universities or training programs in later life barely raise individual entrepreneurial intentions. Our research provides one potential explanation for this finding: entrepreneurial intentions are formed during school-age and may be hard to change later in life. Instead, the German reunification experiment suggests that changes in schooling, curricula, extra-curricular activities, etc., could be policy measures to stimulate entrepreneurial intentions. Research by Falck and Woessmann (2013) and Sobel and King (2008) supports this interpretation.

The remainder of this paper is organized as follows: Section 2 reviews the formal and informal education at school age in East and West Germany. Section 3 introduces our empirical strategy and the data used. Section 4 presents our main results and robustness checks. Section 5 concludes.

2. Formal and Informal Education at School-Age in Germany

Education policies in the German Democratic Republic (GDR) were centrally determined by the ministry for national education. Formal education was organized into a unitary school (*Polytechnische Oberschule*) that combined primary and secondary school. All students attended this school for ten years (Waterkamp, 1987). A small fraction of students were allowed to continue school for two more years at an extended secondary school (*Erweiterte*

polytechnische Oberschule), which prepared them for academic studies.[4] Access to this extended secondary school was not merely based on school achievement but also depended on loyalty to the ruling socialist party. Entry criteria involved participation in the socialist party's youth organisation FDJ (*Freie Deutsche Jugend*), a declaration of commitment to serve in the army, and the parents' socialist merits. Overall, only 8-12 percent of the students in a given year could enter extended secondary school. This strict selection process was meant to insure future graduates' loyalty to the state (Stenke, 2004).

With the reunification, the six newly-funded East German states adopted the basic structure of the Federal Republic of Germany's (FRG) school system. In the FRG, federal states were responsible for school curricula. School attendance was mandatory during school age from age six until the end of secondary school.[5] All children living in the FRG were required to attend primary school from grade 1 to grade 4. After grade 4, teachers assessed the students' academic qualifications and recommended one out of three different types of secondary schools: *Hauptschule*, *Realschule*, or *Gymnasium*.[6] However, this recommendation was not always binding and parents had some freedom to choose the type of secondary school.

Hauptschule (until grade 9) has a focus on vocational skills and prepares students for part-time enrolment in a compulsory vocational school combined with apprenticeship training. *Realschule* (until grade 10) prepares students for part-time vocational schools, technical schools, and higher vocational training. Finally, *Gymnasium* (until grade 12 or 13, depending on the federal state) qualifies children for academic studies and grants the universal university entrance diploma called *Abitur*. This *Abitur* is the requirement to attend a comprehensive, PhD-granting university in Germany. Universities of Applied Sciences as an alternative to comprehensive universities do neither offer doctoral degrees nor medical degrees or law degrees. They are more practise-oriented and they accept students with certificates from secondary school, often in combination with vocational training or certificates from technical schools. The precise admission requirements vary between states, universities, and subjects.[7]

Compared to the GDR system, the FRG's schooling system provides significantly more freedom of choice, which by itself might have an influence on the probability to become an

[4] An indirect way to obtain a university-entrance degree was to combine a 3-year apprenticeship with additional schooling after ten years of unitary school.
[5] In most states, the formal obligation to attend school ended at the age of eighteen.
[6] Note that some states have a forth secondary school type called *Gesamtschule*, a comprehensive school that combines two or three secondary school types under the same roof. A detailed description of the German school system and its development can be found in KMK (2015).
[7] In our empirical analysis, we will therefore focus on the leaving certificate that was acquired first if a university student reports multiple certificates from secondary schools. Moreover, we will account for structural differences between universities with university-fixed effects.

entrepreneur (Sobel and King, 2008).[8] However, the main difference between the two school systems relates to their school curricula. The GDR aimed at forming socialist personalities by teaching communist convictions, as explicitly stated in the socialist party's 1989 manifesto (67f.). From grade seven on, students had to attend lessons in Marxism and Leninism as part of social studies (*Staatsbürgerkunde*). From 1978 on, this subject was supplemented by preliminary military training (*Wehrkundeunterricht*) for male students. In contrast, social studies in the FRG (*Sozialkunde*) focused on mechanisms of the democratic process and civil rights. Moreover, economics courses introduced GDR students to socialist production tenets (Judt, 1997).

By contrast, the FRG curriculum taught the mechanisms of a free-market economy. More specifically, the assembly of the federal states' ministers of education (KMK) in 1973 defined overarching goals for teaching in (West-) German schools. These goals state that schools should train intellectual competencies, but they should also educate students in the spirit of "freedom and democracy", enable them to "think critically by themselves", to "act independently", and to engage in "creative activities" in line with the principles of a "pluralistic society" (KMK, 2005, 7).

In the GDR, the state's influence on school-age education was not confined to the formal school curricula. Extracurricular activities were also state-run and provided another channel to streamline the youth ideologically. By far the most relevant part of informal education took place in the Socialist party's youth organizations (FES, 1984). Upon entering elementary school at age six, children would usually join the Young Pioneers *(Jungpioniere*), where they remained Junior Pioneers until third grade, rising to Thaelmann Pioneers from grade four to the end of grade seven. The Young Pioneers' goal was to educate young socialists into the values the collective. Their activities comprised afternoon meetings on Wednesdays and camps, but also social tasks like waste collection, looking after elderly people or upkeeping of public spaces. In 1988, around 1.5 million children between ages 6-13 were members of the young pioneers. This corresponds to a 96-percent participation rate.[9] In West Germany, extra-curricular activities were privately organized by non-profit organizations. Students freely chose to participate in e.g. sports clubs or civic organizations–or to stay at home after school.

[8] Unfortunately, we do not know the federal state where university students graduated from secondary school. Therefore, we cannot investigate how specific differences in secondary schooling affect the formation of entrepreneurial intentions.

[9] The underlying numbers are published in Statistisches Jahrbuch (1989), pages 355 and 412. Zilch (1999) provides more statistics and discusses them in detail.

In grade eight at the age of 14, children in the GDR would usually move on to the socialist youth organization Free German Youth (*Freie Deutsche Jugend, FDJ*). At the same time, students would also attend the Youth Ceremony (*Jugendweihe*) that was meant to be an alternative to the Christian Confirmation and marked the entry into adult life. The FDJ organized nearly all parts of youth life, including cultural activities, sports, and trips. While attending these extracurricular activities was not compulsory, not attending entailed severe disadvantages, since they were, for instance, one of the entry criteria into professional life thus determining the occupational choices. As a result, almost 80 percent of the youth aged 14-25 were FDJ members (Mählert, 2001; Zilch, 1999). After reunification, the youth socialist organizations ceased to exist, but the youth ceremony survived as one of the few remaining elements of East German culture. This may be explained by the comparatively low importance of religion as an alternative.

Taken together, formal and informal education in the GDR was designed to educate "socialist" individuals who held a critical attitude towards free-market economies and particularly the role of entrepreneurs. When students are taught time and again that entrepreneurs are expropriators, it can be expected that this will sustainably affect their own desire to become an entrepreneur in the future. For instance, the exploitation of workers by entrepreneurs, referred to as "capitalists", was an overarching topic of the subject social studies (*Staatsbürgerkunde*). The following quotes from GDR-schoolbooks illustrate this. Grade 7: "Socialism has established the most progressive thing one could ever think of: those who create all values own them and can use them. […] However, there exists not only Socialism. There is also Imperialism: Where life is characterized by stark contradictions; where factories, machinery, and land are owned by the few, where people continue to be exploited, and where politics drives the wealth of the powerful (SBK, 1983a, 7)." Grade 8: "In the FRG, monopolies rule the economy. Tens- and hundreds- of thousands of workers are exploited in monopoly-enterprises. They are led by monopoly-capitalists. All value created by the workers is owned by capitalists who pocket tremendous profits (SBK, 1984, 80)." Grade 9: "The capitalists, the `employers' – as they refer to themselves and like to be referred to – try everything to conceal exploitation and its continuous intensification. The entrepreneurs and their mass media rely on fake arguments (SBK, 1983b, 47)." Grade 10: "The revolutionary reorganization of the world will eradicate the foundations of capitalist exploitation. Thereby, it will eliminate the roots of nationalist suppression and devastating wars forever (SBK, 1989, 41)."

With reunification, the structures of the West German educational system were adopted in East Germany (Wilde, 2002; Block and Fuchs, 1993). First and foremost, this change involved the immediate elimination of any socialist element from the curriculum and the gradual replacement of former "socialist" teachers.[10] Additionally, the informal education in ideology-based youth organizations came to an end. The new educational goal was now to develop independent personalities, foster critical thinking, creativeness and initiative, and overall, instil democratic values in line with the free-market economy (Fuchs-Schündeln and Masella, 2015). Thus, with the change in the educational system, East German students were suddenly exposed to virtues that are also conducive to entrepreneurship.

3. Basic Empirical Strategy

3.1 Difference-in-Differences estimation in repeated cross-sections

To identify how the changes in school-age education that came with German reunification affected individual entrepreneurial intentions, we employ a difference-in-differences (DiD) strategy for a sample of university students in reunified Germany who were all born before the reunification, either in the democratic FRG (West) or the socialist GDR (East). In the simplest case, the DiD framework compares students raised in the East who graduated from secondary school before or after reunification to a West German control group.[11] To implement this approach, we estimate the following basic regression specification:

Equation 1:

$$I_{iwum} = \alpha_w + \alpha_u + \alpha_m + \beta_1 East + \beta_2 After90 + \beta_3 (East * After90) + X'\beta_4 + \epsilon_{iwum}$$

The dependent variable I_{iwum} measures university student *i*'s entrepreneurial intentions, i.e. *i*'s willingness to become an entrepreneur in the future, observed in survey wave *w* when studying major *m* at university *u*. *East* is a dummy variable that equals unity if university student *i* graduated from secondary school in East Germany (before or after reunification), and zero if schooling was completed in West Germany.[12] This variable accounts for time-

[10] Since the pupil-teacher ratio had been significantly lower in the GDR – 11.8 compared to 15.7 in the FRG in 1985 (Stenke, 2004, 16) –, there was some room for dismissals. Overall, about one-third of the GDR teachers lost their jobs, predominantly those who were politically involved.

[11] We thus define school-age education to end with graduating from secondary school.

[12] Since mobility of families with children of school-age is rather low across German states (*Bundesländer*), we also consider this to be a proxy for a students' region of birth. We will discuss potential biases related to migration in section 4.2.

persistent GDR influences. *After90* is another dummy variable that is unity if secondary school was finished in reunified Germany, and zero if the student graduated from secondary school in either the GDR or the FRG before reunification. *After90* thus captures a post-reunification-trend common to all university students.

The coefficient of interest is β_3, the difference-in-differences estimator that captures the effect of experiencing reunification during school-age on East German students' entrepreneurial intentions. East German students who received some formal and informal education under the free-market economy in reunified Germany should be more similar to the West German control group than East German students who only experienced formal and informal education in the GDR.

Matrix X includes a comprehensive set of individual-level control variables relating to university students' demographics (including student age and age squared, and information on parental entrepreneurship), study progress and motives (including students' GPA in their secondary school diploma, and their reasons for studying), personal characteristics (including attitudes towards competition), and the students' social network (including information on peer contact).[13] This rich set of background variables allows us to control for demographic and idiosyncratic effects on entrepreneurial intentions that may structurally differ between students born in either East or West Germany. ε_{iwum} is an error term clustered at the university-by-survey-year level.[14]

Beyond the individual controls, we add survey year fixed effects α_w, university fixed effects α_u, and major fixed effects α_m. Note that university choice and the choice of a specific major can also be considered part of the treatment effect as education in a free-market economy may affect students' entrepreneurial intentions through their university and subject choice (Fuchs-Schündeln and Masella 2015). Since we only exploit within-university and within-major variation, we overcome potential selection bias. University fixed effects further control for time-persistent differences in the orientation of the university towards entrepreneurship; major fixed effects pick up structural differences in the job market opportunities for graduates from different fields; and survey year fixed effects control for cyclical influences on the attractiveness of entrepreneurship. Since all university students were born before reunification, and all surveys were conducted after reunification, survey year fixed effects

[13] A detailed list of all control variables is provided in Appendix A.1.

[14] Our results are robust towards alternative levels of clustering, namely university-, major-, and university-by-major-level.

additionally guarantee that we only compare students who lived the same number of years in reunified Germany. The DiD setup thus allows us to identify the effect of school-age education in a free market economy– i.e. the effect of curricular and extracurricular activities that contribute to the formation of individual attitudes, preferences and beliefs–on university students of similar age who spent the same amount of time in reunified Germany.

3.2 Student Survey Data

To assess students' entrepreneurial intentions, we employ repeated cross-sectional data from a large student survey regularly conducted by the University of Constance (*Studiensituation und studentische Orientierung*). Five survey waves conducted after German reunification contain information on whether students graduated from secondary school in East or West Germany.[15] We use this information as a proxy for growing up in either East or West Germany. The surveys were conducted in the winter terms 1992/93, 1994/95, 1997/98, 2000/01, and 2006/07. This gives us a sample of 37,419 students at 26 full universities and universities of applied sciences in Germany. The spatial distribution of the observed universities along with the number of individual observations is shown in Figure 1.

[Figure 1 here]

The survey asks for the students' occupational plans for the future. We use the survey question "Do you want to be permanently self-employed in the future (entrepreneur or freelancer)" as indicator for students' entrepreneurial intentions.[16] Answers are given on a five-point-scale, ranging from "Certainly not" to "Yes, certainly". We *z*-standardize this categorical variable in our baseline estimations. The same categories apply to questions on the attractiveness of other occupations (dependent employment in a company, public service, academia, etc.) that will be used for robustness checks. We furthermore employ information on whether the student finished secondary school in East or West Germany along with information on the graduation year from secondary school. Interacting time and place of graduation then allows us to estimate our DiD framework.

The survey provides a rich portfolio of background information on the students' demographics, parental background, social activities, study progress, motives for studying and choosing one's subjects, and personal characteristics.[17] Table 1 provides descriptive statistics

[15] We drop observations of students who finished secondary school abroad.

[16] In the robustness checks, we will present specifications where we drop observations of students who, conditional on their majors, are likely to become freelancers. Doing so does not affect our results.

[17] Throughout all specifications, we thus control for age and its square, gender, having children, marital status, parents' education, parents being entrepreneurs, aspired degree, terms studied, GPA in secondary school

for a selection of our control variables. Columns 1 and 2 compare students who graduated from secondary school in West Germany before (Column 1) or after (Column 2) reunification. Columns 3 and 4 do the same for students who graduated from secondary school in East Germany. A simple mean comparison of students' entrepreneurial intentions suggests a difference-in-differences effect of 0.17.

However, the descriptive statistics also reveal differences in other observables. East German students are somewhat younger than West German students, more junior in their studies, and more often female. East German students who graduated from secondary school in the GDR are comparatively unlikely to have entrepreneurial parents, while East German students who finished secondary school in reunified Germany are significantly more likely to have entrepreneurial parents. This observation reflects the trend in East German self-employment rates catching-up with West Germany (Fritsch et al. 2015; 2014). Bauernschuster et al. (2012) show that individual attitudes shaped under Socialism nevertheless continue to depress entrepreneurial intentions. We will explicitly account for differences in the economic development of East and West Germany in section 4.3.

Our design further implies that students who graduated from secondary school before reunification are somewhat older on average, more senior in their studies, and less frequently observed in the later survey waves. We will control for all these differences and additionally provide robustness checks where we match the samples on observables to make sure that all individual-level controls commonly support the treatment variables. To account for the fact that unobservable characteristics may still bias our estimations, we will also present an individual-fixed-effects specification in our robustness checks.

[Table 1 here]

We present a detailed description of all control variables in Appendix A.1. Finally, note that missing observations in idiosyncratic controls have been imputed with the sample mean while missing values for outcome variables, the university or major, and for the baseline controls have not been imputed.

diploma, already holding a university degree, having changed majors, various study motives, reasons for choosing field of studies, indicators for satisfaction with study choice and progress, having a student job, various personal characteristics and relevance of certain areas of life, political attitudes, participation in clubs and organizations, and social contact to peer groups and family. A full list of our control variables is provided in Appendix A.

4. Main Results

4.1. Effects of the Reunification Shock

In a first step, we present results for our basic DiD-specification where we regress university students' standardized entrepreneurial intentions on an *East* dummy indicating whether the student graduated from secondary school in East Germany (or the former GDR), a dummy variable *After90* indicating whether the student graduated from secondary school after reunification in 1990, and an interaction term *East×After90* indicating whether an East German student received some formal and informal education in reunified Germany before finishing secondary school. Results are reported in Table 2.

[Table 2 here]

The coefficient of the East dummy shows that university students who were born in the GDR (and thus experienced some socialist education and socialization) have significantly lower entrepreneurial intentions than students raised and educated in West Germany. These findings are conditional on survey-year, university, and major fixed effects. The effect decreases in size once we control for demographics and family background (Column 2); study-related issues (Column 3); personal characteristics (Column 4); and the student's social network (Column 5), but it remains significantly negative throughout all specifications. At the same time, the *East×After90* interaction shows that experiencing German reunification at school age, i.e. the sudden change to formal and informal education in the free-market economy of reunified Germany, does have a significantly positive effect on entrepreneurial intentions of university students born in East Germany. Entrepreneurial intentions of students born in West Germany are not affected by the reunification shock once we include individual-level controls (as indicated by the insignificant *After90* dummy).

Column 6 is our preferred specification, where we include all control variables. Our results indicate that university students born in East Germany have, on average, 13.3 percent of a standard deviation lower entrepreneurial intentions than students born in West Germany. Compared to this group, students who were born in East Germany and experienced German reunification during school-age turn out to be much more entrepreneurial. Accordingly, if an average East German university student was treated with education in the free-market economy, this would reduce the negative effect of socialism by (0.104/0.133×100) 78 percent. In unreported specifications, we alternatively use years of school attendance as a (less exogenous) explanatory variable. Results from these regressions suggest that it would take 10.6 years of free-market education for an average East German student to catch up with an

average West German student's entrepreneurial intentions. There is no significant effect, either in statistical or in economic terms, of education after reunification on the entrepreneurial intentions of university students born in West Germany.

So far, we have estimated the effects of reunification on university students' standardized entrepreneurial intentions using OLS. We now exploit the fact that the original variable is measured on a five-point scale and estimate ordered probit models. Doing so helps us investigate the marginal effects on steps of the outcome scale. Results are reported in Table 3.

[Table 3 here]

We report marginal effects for the treatment variables *East*, *After90*, and *East×After90* with all other variables evaluated at their sample means. Columns 1-5 refer to the five different outcome categories of the question "Do you want to be permanently self-employed in the future (entrepreneur or freelancer)", ranging from "certainly not" (Column 1) to "yes, certainly" (Column 5). Both the *East*-Dummy measuring the effect of socialist education and the *East×After90*-interaction-effect measuring systemic change affect all outcome categories, with a significantly weaker effect on being indifferent towards entrepreneurship, and a significantly stronger effect on having pronounced entrepreneurial intentions. The point estimates of the *East*-dummy are always larger than the point-estimates of the interaction effect and *East×After90* has always the opposite sign. The effect of education in reunified Germany on students born in West Germany is always insignificant and close to zero. Most obviously, school-age education in reunified Germany affects university students' attitude towards entrepreneurship along the whole spectrum. These findings justify the use of a linear model in the remaining sections.[18]

4.2. Robustness and Validity

In a next step, we test the robustness and validity of our findings using subsample analyses, including propensity score matching. Results are presented in Tables 4 and 5.

[Table 4 here]

One could be concerned that our results were driven by "structurally entrepreneurial" subsamples, be it students aiming at professions that typically lead to self-employment, or students who could not, for any (e.g. political) reason, acquire their preferred qualification in the socialist GDR, and made up for it after reunification. Moreover, the robustness tests

[18] In unreported specifications, we repeated the OLS estimations on a sample without students who are indifferent towards entrepreneurship. As already suggested by the small effects of this outcome category in the ordered-probit regressions in Table 3, this only leads to a slight increase in the DiD-coefficients.

presented in Table 4 account for potential biases related to the structure of our data and confounding effects of the German division and reunification.

In Column 1 of Panel A, we repeat the estimation from Table 2, Column 6, leaving out medicine and law students, who are likely to become freelancers in the future. Removing those study fields rather increases the size of the effects.

The descriptive statistics in Table 1 revealed that East German university students are more likely to having entrepreneurial parents if they graduated from secondary school after reunification. To account for this difference, we exclude observations with at least one self-employed parent in Column 2. We obtain very similar results, which shows that increasing self-employment rates in East Germany do not bias our results.

Our empirical setup implies that we necessarily observe a smaller number of students who graduated from secondary school before reunification in later survey waves. Still, we decided to employ all survey waves since we want to observe university students with varying degrees of school-age education in the free market economy, including those with a complete school career from first grade to graduation in reunified Germany. However, doing so may induce a downward bias in our estimations, because the reference group of less-entrepreneurial East German students educated entirely in the GDR is under-represented in the later waves. To assess this potential bias, we drop the last two survey waves and restrict the sample to university students surveyed in the 1990s in Column 3. As expected, the coefficients of interest do indeed increase in size, while the ratio between *East*×*After90*-coefficient and *East*-coefficient increases only slightly.

The survey questionnaire contains a number of questions on university students' expectations towards their future job, e.g. how important it is for them to find an occupation where they can realize their own ideas, exert leadership, or on the relevance of job security. We did not include those variables into our regressions since they would be "bad controls", i.e. being causally affected by our treatment-variable "receiving school age education in reunified Germany" while at the same time affecting our outcome variable "entrepreneurial intentions". Put differently, the variables on job expectations reflect the channel through which school-age education does affect entrepreneurial intentions, i.e. by affecting occupational preferences. However, preferences for certain features of future jobs might also be affected by unobserved individual characteristics. We thus include additional individual-level control variables on students' expectations towards their future job in Column 4. As expected, the inclusion of bad controls decreases both coefficients of interest in size, with the relation between *East*×*After90* and *East* remaining fairly stable at 0.72.

Next, we present a placebo-specification for students who are studying to become a teacher.[19] Since they have already made a clear occupational choice, entrepreneurship should be an irrelevant occupational alternative, which should consequently not be directly affected by exogenous influences. Results of this placebo-exercise are reported in Column 5. Reassuringly, we do not find an effect on students who should not be affected.

One may be concerned that our effects are biased by students who experienced reunification after they had started studying in the GDR and suddenly had to adjust their career plans. To account for that, Column 6 of Panel B restricts the sample to students who started studying after reunification in 1990. Again, the coefficients remain essentially the same.

It may also be the case that some current university students had been denied university entry in the GDR for political reasons, and started studying at a late age after reunification. Because of their age or experiences, those students may be specifically entrepreneurial. In Column 7, we thus restrict the sample to university students who were no older than 21 when they started studying. In the same vein, university students might have not been allowed to finish secondary school with a university entrance qualification in the GDR, and went back to school after reunification. In Column 8, we thus restrict the sample to university students who graduated from secondary school at the "usual" age of 18 or 19. This also rules out that our effects are driven by early or late school graduates. To account for the heterogeneity in leaving certificates that qualify for university studies, we present a specification where we restrict the sample to university students holding the most common high-school-certificate "*Abitur*" in Column 9. Reassuringly, our initial results hold in all subsamples.

Typically, students who graduated from secondary school before reunification tend to be slightly older than university students who were surveyed in the same wave and graduated from secondary school after reunification. These age differences should not be a major concern, since all students are surveyed during the same period of their lives while they are still studying at university. However, given the relevance of age for the decision to become an entrepreneur (Boente et al., 2009; Parker, 2009), one might be concerned by the fact that West German university students who graduated from school before reunification are on average older than the other groups (cf. Table 1). This partly relates to the fact that the share of male students is comparatively high in this group (at a time when military service was mandatory for men in Germany), but also to a longer tail of long-term university students. Throughout all specifications we have controlled for students' age (and its square), gender, and related

[19] In Germany, school teachers need to obtain a specific university degree (*Staatsexamen Lehramt*) that exclusively qualifies for becoming a teacher.

differences like marital status or having children. In column 7, we additionally restrict the sample to university students between 20 and 30 years of age at the time of observation.[20] Our initial results hold.

One big advantage of our dataset is the great number of individual-level control variables. To guarantee common support of all covariates, we now employ propensity score matching (PSM) techniques. Results are reported in Table 5. Summary statistics on the matched samples are provided in the Appendix B.

[Table 5 here]

Panel A reports results from samples matched on the *East*-Dummy. Panel B reports results from samples matched on the *East*×*After90*-Dummy.[21] Based on all individual-level controls but excluding fixed effects, we calculate propensity scores for the respective treatment variable and keep treated observations along with their seven nearest neighbors.[22] We then repeat the previous DiD-estimations on the more homogenous matched samples. In a first specification, we retain all treated observations (i.e. all East German university students or all East German university students who finished secondary school in reunified Germany) and their nearest neighbors. As Columns 1 and 4 of Table 5 show, our initial results hold if we improve the common support of all control variables using PSM.

In a second specification, we put a deliberate focus on homogenizing subsamples in terms of university students' age. As mentioned above, previous research suggests an inverse u-shaped relationship between entrepreneurship and age, with a peak at age 40. Similarly, individual entrepreneurial intentions may increase with age such that significant age differences between treatment and control group could induce confounding trends. To account for that, we first calculate propensity scores based on the age variable only and drop 20 percent of all observations with the lowest propensity scores. After that, we again match on all observables and select nearest neighbors. Results are reported in Columns 2 and 5. Reassuringly, they suggest that remaining age differences between treatment and control group do not bias the effects in our main specification.

A final concern with the validity of our results relates to the fact that we cannot explicitly account for migration. We only observe where university students graduated from secondary

[20] In the original sample, students' age ranges from 17 to 65 years, with a mean of 24.62 and a median of 24.

[21] Estimations on matched samples using the *After90*-Dummy or stepwise combinations of the *East* and the *After90* Dummy produce similar results.

[22] Matched-sample-estimations show consistent patterns when we retain different numbers of nearest neighbors. We chose seven nearest neighbors to ensure that we always keep between 50 percent and 75 percent of the original sample. We apply this rule to all our matching specifications.

school, but not where they were born. If this measurement error was the same for East and West German students we would face a downward bias. More worrisome would be a scenario where comparatively entrepreneurial children at school age moved with their families from West Germany to East Germany after reunification. In that case, the positive *East×After90* effect could not only indicate a change in East German students' entrepreneurial intentions, but also selective in-migration. Although we cannot directly control for this confounding effect, the literature clearly shows that East-West migration was the dominant migration pattern within Germany after reunification (Fuchs-Schündeln and Schündeln, 2009; Hunt, 2006; Burda, 1993), and that the few West-East migrants were predominantly returning East Germans (Beck, 2004).

To address the potential bias more formally, we add a third matching specification where we first drop 5 percent of the treated observations with the lowest propensity score before selecting nearest neighbors. Conditional on their individual characteristics, those East German university students who were dropped from the sample have a low probability of being East Germans (Panel A), or of being East Germans and having received free-market education (Panel B). If we had miscoded a relevant number of East Germans who were actually born in West Germany, we should obtain substantially different results from these specifications. However, Columns 3 and 6 of Table 5 clearly show that this is not the case.

The alternative case would be selective migration from East to West Germany. This did indeed happen and it may very well be the case that we erroneously code a number of migrants from East to West Germany as students who were never exposed to any socialist education or socialization. If more entrepreneurial families were more likely to move, we would expect a downward bias from unobserved East-West migration. In that case, our results would be a conservative lower bound. However, the insignificant *After90*-Dummy implies that inner-German migration is of second-order importance for our regression results.

In summary, our results are extremely robust to the exclusion of selective subsamples, both in terms of significance and effect size. Specifically, the relative effect of receiving school-age education in reunified Germany as compared to receiving school-age education in the socialist GDR turns out to be fairly stable. We take this as first indication that our empirical strategy is successful in overcoming potential endogeneity bias.

4.3. East German Specific Trends and Event Study

In our baseline regressions, we control for a full set of survey year dummies. These dummies capture changes in the attractiveness of entrepreneurship over time. Moreover, they control

for the effects of living in a free-market economy, i.e. the general effects of socialization in reunified Germany, since they ensure that we only exploit variation in the entrepreneurial intentions of university students who have been living in reunified Germany for the same number of years (from 1990 until the survey year). Given the structure of our research design, we can even go one step further and control for East- and West-German specific time trends after reunification.

Changes in the attractiveness of entrepreneurship over time might occur because of changes in the economic environment, but also because of changes in the general perception of entrepreneurship. Such changes might differ between East and West Germany. For instance, East Germany might have been differently affected by changing entrepreneurial opportunities or expected returns to entrepreneurship. Specifically, the parental and societal influences may have developed differently. After reunification, East German parents might have e.g. started accumulating wealth, which could affect their children's formation of entrepreneurial intentions. This could potentially bias our estimates, particularly since we observe an increasing number of treated university students in later survey waves. An East German-specific time trend would account for such differences in economic development after the reunification between East- and West Germany. We thus extend our baseline specification from equation (1) by additionally interacting the survey-year dummies with the *East* dummy. Results are shown in Table 6.

[Table 6 here]

Table 6 clearly shows that the positive effect of school-age education in reunified Germany is not confounded with an East-specific positive effect of living in reunified Germany or of being raised by increasingly wealthy or entrepreneurial East German parents.[23] Instead, the treatment effect slightly increases in size when controlling for this East German-specific trend, suggesting that parental and societal influences work in the opposite direction.

So far, we have identified the average treatment effect over several years of school-age education in reunified Germany. To assess whether the treatment varies with the duration of education in reunified Germany, we now turn to parametric event study estimates. Importantly, the event study estimates also shed light on the existence of common pre-existing trends in East German and West German students' entrepreneurial intentions. The estimation equation for the event study analysis is an extension of our baseline equation (1):

[23] Note that the coefficient size of the *East* dummy cannot be interpreted in this specification since it is measured relative to the omitted *East*wave* Dummy. We thus do not report coefficients of the *East* and the (insignificant and close to zero) *After90* main effects.

Equation 2:

$$I_{iwum} = \alpha_w + \alpha_{w,East} + \alpha_u + \alpha_m + \alpha_{East} + \alpha_{GradCohort_c} + X'\beta + \sum \gamma_{-89}\left(East * GradCohort_{c_{-89}}\right) + \sum \gamma_{+90}\left(East * GradCohort_{c_{+90}}\right) + \epsilon_{iwum}$$

In this extended equation, we add a full set of dummy variables for 2-year cohorts of secondary school graduates *c* and their interactions with the *East* dummy. We start with the graduation cohort of the years 1983-84.[24] The γ_{-89} coefficients reflect differences in the pre-treatment trends between university students who were either born in East or West Germany. The γ_{+90} coefficients give us the graduation-cohort-specific treatment effects. All γ-coefficients are estimated relative to the cohort which finished school in the reunification years 1989 and 1990. Results of the event study are shown in Figure 2.

[Figure 2 here]

Figure 2 shows the γ-coefficients from Equation 2 along with the 95%-confidence intervals. For all three graduation cohorts before reunification, the coefficient is small and not significantly different from zero. We interpret this as support for the validity of the common trends assumption in our DiD approach. Only after 1990 does the coefficient increase in size, and it becomes statistically significantly different from zero from the 1993-1994 cohort onwards.[25] The results of the event study analysis imply that already 3 years of school-age education in reunified Germany make a statistically significant difference between those who graduated in 1989-1990 and those who graduated in 1993-1994 (who have otherwise spent the same period of time in reunified Germany).

An alternative approach to investigating whether the duration of treatment does have an effect would be to include an East-specific age trend by interacting the East-Dummy with university students' age. Within survey year, all university students have spent the same the same time in reunified Germany. As a consequence, *East×age* captures the time spent in the GDR. Since all observed individuals are university students, time spent in the GDR mainly refers to being socialized in the GDR during childhood, thus receiving socialist school-age education but not school-age education in reunified Germany. Results of this exercise are reported in Table 7.

[Table 7 here]

[24] Students who graduated from secondary school earlier have been dropped from the sample.
[25] The coefficient for the 1991-1992 graduation cohort is significant at a 10 percent level.

East×age turns out to have a significantly negative effect on students' entrepreneurial intentions. This implies that receiving more socialist school-age education further decreases entrepreneurial intentions. At the same time, it implies that receiving more school-age education in the free market economy further increases entrepreneurial intentions, since both are indivisibly captured in the same variable: Every additional year a university student was educated in the GDR, he or she could not attend secondary school in reunified Germany. Table 7 essentially provides the same insight as Figure 2: While receiving any school age education in the GDR and receiving any school-age education in reunified Germany do have contrary effects, the duration of treatment intensifies these effects.

4.4. Exploiting Within-Student Variation

The previous sections have established a robust and significant effect of experiencing German reunification at school-age on the formation of entrepreneurial intentions. Our findings cannot be explained by general or group-specific time trends, outliers, university- or major-specific effects, or a rich set of observable individual characteristics. We will now turn to a student-fixed-effect specification that allows us to test whether unobservable individual characteristics bias our results. For this purpose, we exploit the fact that we observe the same university student answering multiple questions on the attractiveness of different occupational alternatives. The survey poses the question "In which area do you want to be permanently employed in the future?", and asks students to evaluate each of the seven answer categories "self-employed (entrepreneur or freelancer)", "at school", "at university", "other public service", "non-profit-organization", "employment in a private company", and "alternative work projects and collectives", using a 5-point-scale. This gives us the opportunity to evaluate the attractiveness of entrepreneurship relative to other occupations in a student fixed effect specification.

To implement this strategy, we create a new outcome variable, "occupational choice". For every university student, it contains her evaluation of entrepreneurship as occupational choice. For every individual student, we add an observation of her most preferred other occupational alternative, i.e. the highest value on the five-point-scale that does not refer to entrepreneurship. With two observations per individual, we can estimate

Equation 3:

$$I_i = \alpha_i + \beta_1 Eship + \beta_2(East * Eship) + \beta_3(After90 * Eship) + \\ + \beta_4(East * After90 * Eship) + \epsilon_i$$

The dependent variable I_i measures university student *i*'s evaluation of entrepreneurship and *i*'s most preferred other occupational alternative. Again, I_i is standardized to a mean of zero and a standard deviation of one. *Eship* is a dummy variable that equals unity if I_i measures entrepreneurship as an occupational choice, and it takes the value zero for the student's most preferred other occupation. Accordingly, β_1 measures the relative attractiveness of entrepreneurship. Since we observe two occupational preferences per university student, we can include individual fixed effects α_i to account for unobservable student characteristics. *East×Eship* is an interaction term that measures how being born and raised in the GDR affects the relative attractiveness of entrepreneurship. *After90×Eship* measures whether the relative attractiveness of entrepreneurship changes with education in reunified Germany. Finally, the triple interaction term *East×After90×Eship* gives us the treatment effect on East German university students who experienced German reunification at school age and were educated for some years in the free-market economy. We do not add further control variables since they are absorbed by the individual-level fixed effects. However, we can run estimations on the matched samples that were introduced in Table 5. Results are reported in Table 8.

[Table 8 here]

The results reveal that entrepreneurship is relatively unattractive to university students. On average, they have 85.5 percent of a standard deviation lower preferences for entrepreneurship than for their most preferred other occupation. In line with our previous results, the aversion to entrepreneurship is relatively stronger among students born and raised in the socialist GDR. They score another 19.0 percent of a standard deviation lower. However, if East German students were treated with some free-market education in reunified Germany, they would find entrepreneurship 11.9 percent of a standard deviation more attractive than East German students who were not treated. This is about 63 percent of the negative East effect on the relative attractiveness of entrepreneurship. For West German university students, being educated in reunified Germany does not make a difference. We obtain almost the same results when repeating the estimations on the more homogenous matched samples.

It is reassuring to see that we find very similar results in regressions with individual fixed effects. We interpret it as evidence that the DiD results reported above are unlikely to be confounded by unobserved individual heterogeneity. Given the large number of individual-level controls at hand, this is plausible. Overall, these findings make us confident that we

estimate a causal effect of formal and informal school-age education in the free market economy on the formation of university students' entrepreneurial intentions.

5. Conclusions

To the best of our knowledge, this is the first paper to look at the effect of formal and informal education during school age on the formation of entrepreneurial intentions. To establish causality, we exploit the German reunification as a natural experiment that implied a sudden and sustained change in the way individuals were being educated before finishing school. All socialist ideology was dropped from school curricula, and extracurricular activities in the socialist party's youth organization came to an end. Using this extreme case of a change to school-age education, we find that university students who experienced the systemic change from socialism to capitalism during school age have on average 78 percent higher entrepreneurial intentions than otherwise similar students who finished their education in the socialist system. The treatment effect increases with the duration of treatment. In other words, our results imply that East German students would catch up with the entrepreneurial intentions of their West German counterparts after around eleven years of school-age education in the free-market economy.

The effect of reunification on entrepreneurial intentions cannot be explained by the mere experience of reunification (and the related upheavals), since all university students in our survey share this experience. Moreover, the effect is not simply the result of living in a free-market economy. To exclude this possibility, we only exploit variation from students who were surveyed in the same year, i.e. who lived in reunified Germany for the same number of years. Our results show that the observed effect on entrepreneurial intentions is neither driven by a correlated East-German-specific time trend, nor by unobserved individual characteristics. In fact, the effect exclusively affects East German university students who experienced the reunification shock when they had not yet finished secondary school.

While our results suggest that school-age education can affect the formation of university students' entrepreneurial intentions, we cannot distinguish whether entrepreneurial intentions increase due to the establishment of new educational measures, or due to the demise of old ones. More specifically, we cannot make inferences on the relative importance of changes in the curricula, the organizational structure of the school system, or the extra-curricular participation in clubs and associations that also have educational effects. Further research is needed to identify concrete educational measures that affect the formation of entrepreneurial intentions during school age.

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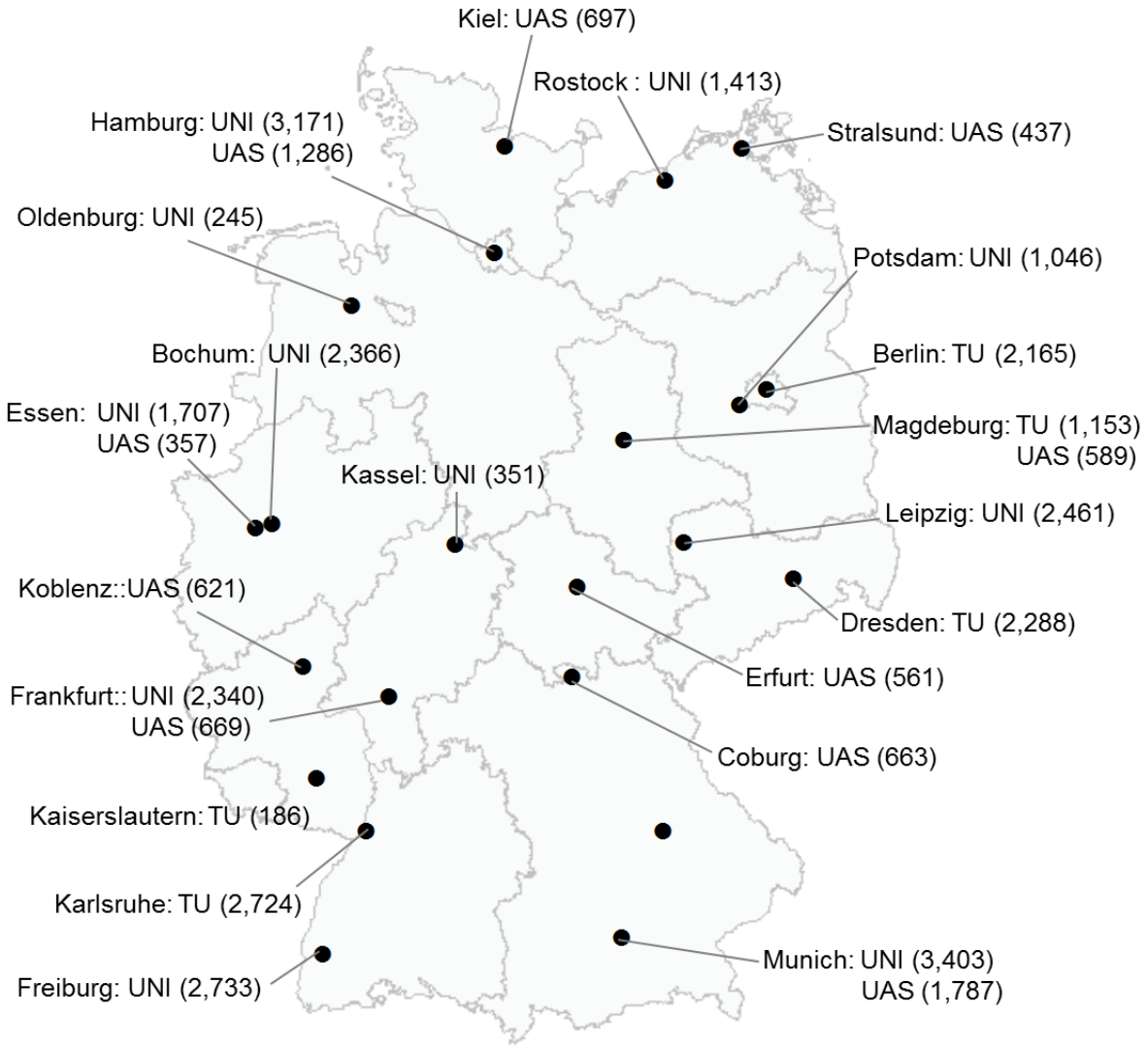
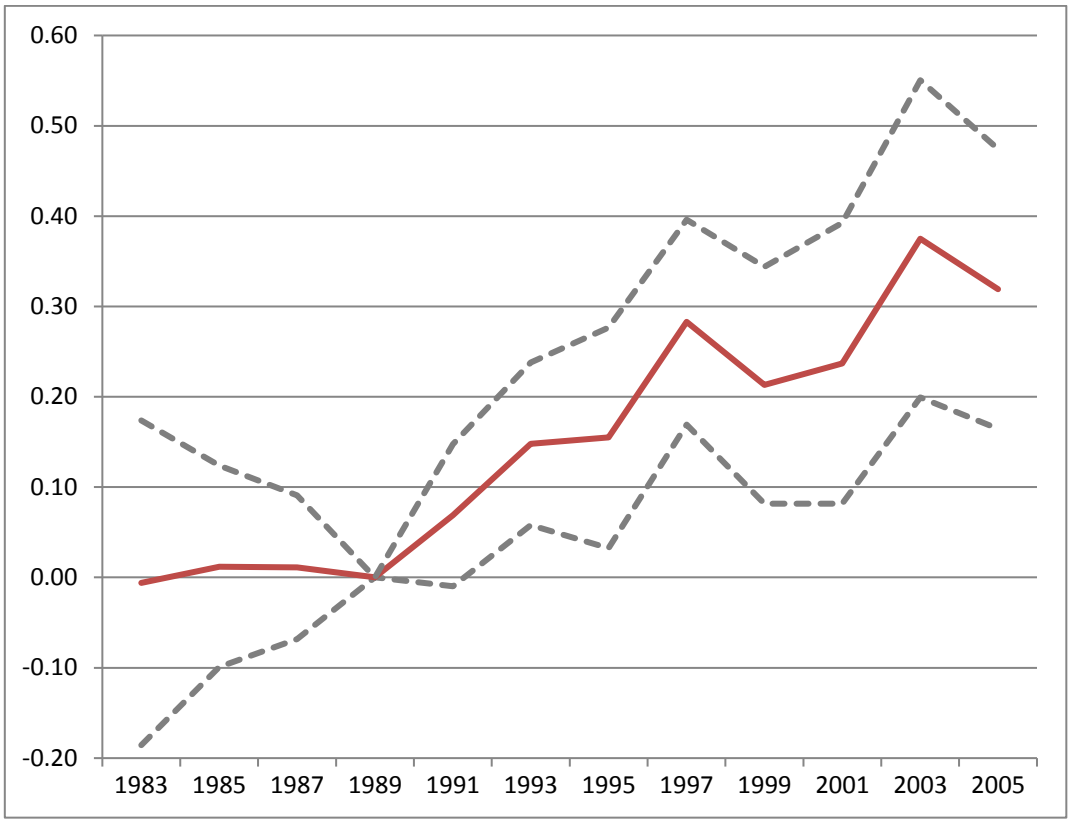
Figure 1: Universities Observed



Notes: Figure depicts spatial distribution of Universities (UNI), Technical Universities (TU), and Universities of Applied Sciences (UAS) observed in the student survey. Number of individual student observations is given in parentheses.

Figure 2: Event Study



Notes: Solid red line depicts γ-coefficients estimated from Equation 2 with 2-year-graduation-cohorts (secondary school). Baseline cohort (years 1989-1990) is marked. Dashed lines depict related 95%-confidence intervals.

Table 1: Descriptive Statistics

		West German		East German	
	graduated from secondary school:	before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		11,820	15,724	2,641	7,234
entrepreneurial intentions (avg.)		0.47	0.43	0.23	0.36
entrepreneurial intentions (std. avg.)		0.04	0.01	-0.14	-0.04
survey wave	WT 1992/93	46.84	5.24	56.38	7.27
	WT 1994/95	34.23	12.74	31.88	11.83
	WT 1997/98	13.01	21.90	8.37	20.11
	WT 2000/01	4.93	29.05	2.73	29.86
	WT 2006/07	0.98	31.07	0.64	30.92
major subject	linguistic & cultural science	14.42	13.95	10.75	13.55
	psychology	2.31	1.51	1.86	2.43
	social affairs & pedagogics	6.70	7.47	6.70	9.01
	sports science	0.86	1.23	2.01	1.52
	jurisprudence	5.53	6.86	6.85	8.29
	social sciences	3.29	4.21	1.93	5.97
	natural sciences	16.34	17.01	12.23	13.35
	medicine	7.61	8.57	11.17	6.54
	agronomy & nutrition science	1.75	1.76	2.04	2.39
	engineering	23.10	19.79	29.27	18.33
	arts & music	3.26	3.09	1.63	2.09
	economic sciences	14.09	13.88	12.72	15.18
	other	0.75	0.68	0.83	1.34
semester (avg.)		10.50	6.01	7.72	5.47
age (avg.)		27.27	23.63	24.84	22.36
female		36.67	48.98	40.52	59.79
with children		9.92	2.91	13.56	3.62
parents entrepreneur		16.32	15.75	11.02	16.27

Notes: Table reports descriptive statistics on the sample of university students from the "student survey". If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split into students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) the German reunification.

Table 2: DiD-Estimation of the Reunification-Effect

	no ctr	baseline	studies	character	network	all ctr
entrepreneurial intentions	(1)	(2)	(3)	(4)	(5)	(6)
East	-0.217***	-0.181***	-0.136***	-0.182***	-0.178***	-0.133***
	(0.027)	(0.028)	(0.029)	(0.027)	(0.029)	(0.029)
East×After90	0.156***	0.126***	0.102***	0.125***	0.127***	0.104***
	(0.025)	(0.026)	(0.027)	(0.026)	(0.027)	(0.027)
After90	-0.054***	-0.004	-0.005	-0.010	-0.003	-0.008
	(0.014)	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)
FE (wave, uni, major)	yes	yes	yes	yes	yes	yes
baseline controls	no	yes	yes	yes	yes	yes
idiosyncratic controls	no	no	yes	yes	yes	yes
Adj. R-Squared	0.106	0.161	0.193	0.180	0.167	0.206
Observations	37419	37,419	37,419	37,419	37,419	37,419

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1. All specifications include survey year dummies, university dummies, and dummies for the students' majors. Additional control variables are added according to the column headings. A complete list of the related variables is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 3: OProbit Estimation of the Reunification-Effect

entrepreneurial intentions	certainly not (1)	rather not (2)	don't know (3)	yes, perhaps (4)	yes, certainly (5)
East	0.031***	0.031***	0.004***	-0.020***	-0.047***
	(0.006)	(0.006)	(0.001)	(0.004)	(0.009)
East×After90	-0.027***	-0.027***	-0.003***	0.017***	0.040***
	(0.005)	(0.005)	(0.001)	(0.003)	(0.008)
After90	0.003	0.003	0.000	-0.002	-0.005
	(0.003)	(0.004)	(0.000)	(0.002)	(0.005)
FE (wave, uni, major)	yes	yes	yes	yes	yes
baseline controls	yes	yes	yes	yes	yes
idiosyncratic controls	yes	yes	yes	yes	yes
Pseudo R-Squared	0.086	0.086	0.086	0.086	0.086
Observations	37,419	37,419	37,419	37,419	37,419

Notes: Table reports the three treatment variables' marginal effects on the 5 outcome categories derived from an ordered probit regression, with all other control variables held constant at the mean. All specifications include survey year dummies, university dummies, dummies for the students' majors, and all the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 4: Robustness Tests and Effect Validity

Panel A: entrepreneurial intentions	no freelancer (1)	no entr. parent (2)	nineties only (3)	job controls (4)	teacher (5)
East	-0.141***	-0.132***	-0.156***	-0.097***	-0.038
	(0.030)	(0.030)	(0.031)	(0.027)	(0.086)
East×After90	0.114***	0.090***	0.124***	0.070***	0.016
	(0.030)	(0.030)	(0.031)	(0.025)	(0.074)
After90	-0.009	-0.007	-0.009	-0.001	0.021
	(0.020)	(0.019)	(0.022)	(0.016)	(0.052)
Adj. R-Squared	0.200	0.202	0.208	0.248	0.124
Observations	31,891	31,545	22,781	37,419	3,847

Panel B: entrepreneurial intentions	studystart after year 90 (6)	studystart<=21 years of age (7)	gradage 18-19 (8)	abitur (9)	20-30 years of age (10)
East	-0.145***	-0.102***	-0.142***	-0.151***	-0.124***
	(0.032)	(0.034)	(0.034)	(0.031)	(0.029)
East×After90	0.112***	0.096***	0.108***	0.105***	0.096***
	(0.030)	(0.030)	(0.030)	(0.028)	(0.026)
After90	-0.014	0.003	-0.004	-0.003	-0.020
	(0.018)	(0.021)	(0.019)	(0.017)	(0.019)
Adj. R-Squared	0.210	0.223	0.214	0.213	0.208
Observations	30,027	25,347	27,670	32,608	33,437
FE (wave, uni, major)	yes	yes	yes	yes	yes
baseline controls	yes	yes	yes	yes	yes
idiosyncratic controls	yes	yes	yes	yes	yes

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1 for the subsamples described in the column headings. All specifications include survey year dummies, university dummies, dummies for the students' majors, and the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 5: Matching on Observables

	Panel A: Match on East			Panel B: Match on East×After90		
	all treated	homogenized	trimmed	all treated	homogenized	trimmed
entrepreneurial intentions	(1)	(2)	(3)	(4)	(5)	(6)
East	-0.133***	-0.109***	-0.126***	-0.109***	-0.131***	-0.084**
	(0.031)	(0.033)	(0.031)	(0.039)	(0.039)	(0.033)
East×After90	0.107***	0.079**	0.109***	0.090***	0.118***	0.071**
	(0.029)	(0.031)	(0.030)	(0.032)	(0.033)	(0.030)
After90	-0.018	0.008	-0.030	-0.026	-0.039*	-0.010
	(0.020)	(0.023)	(0.021)	(0.023)	(0.023)	(0.023)
FE (wave, uni, major)	yes	yes	yes	yes	yes	yes
baseline controls	yes	yes	yes	yes	yes	yes
idiosyncratic controls	yes	yes	yes	yes	yes	yes
Adj. R-Squared	0.210	0.219	0.212	0.207	0.212	0.205
Observations	26,706	21,946	23,596	22,364	19,334	19,986

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1 for subsamples matched on the East-Dummy (Panel A) or the East×After90 interaction dummy (Panel B) by calculating propensity scores and selecting 7 nearest neighbors. Different specifications are defined in the column headings. All specifications include survey year dummies, university dummies, student major dummies, and all the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. Descriptive statistics for the matched samples can be found in the Appendix B. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 6: DiD-Estimation Including East-specific Time Trend

entrepreneurial intentions	no ctr (1)	baseline (2)	studies (3)	character (4)	network (5)	all ctr (6)
East×After90	0.154***	0.131***	0.117***	0.127***	0.131***	0.117***
	(0.032)	(0.034)	(0.034)	(0.033)	(0.034)	(0.033)
East	yes	yes	yes	yes	yes	yes
After90	yes	yes	yes	yes	yes	yes
East×wave	yes	yes	yes	yes	yes	yes
FE (wave, uni, major)	yes	yes	yes	yes	yes	yes
baseline controls	no	yes	yes	yes	yes	yes
idiosyncratic controls	no	no	yes	yes	yes	yes
Adj. R-Squared	0.106	0.161	0.193	0.180	0.167	0.206
Observations	37,419	37,419	37,419	37,419	37,419	37,419

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1, additionally including an East-specific nonlinear trend East×Survey-Wave. All specifications include an East-Dummy, an After90-Dummy, survey year dummies, university dummies, and dummies for the students' majors. Additional control variables are added according to the column headings. A complete list of the related variables is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 7: DiD-Estimation Including East-specific Age Trend

	no ctr	baseline	studies	character	network	all ctr
entrepreneurial intentions	(1)	(2)	(3)	(4)	(5)	(6)
East	-0.189***	-0.163***	-0.123***	-0.164***	-0.161***	-0.119***
	(0.028)	(0.029)	(0.029)	(0.028)	(0.030)	(0.029)
East×After90	0.108***	0.070**	0.053*	0.069**	0.072**	0.052*
	(0.027)	(0.028)	(0.029)	(0.028)	(0.029)	(0.029)
After90	-0.000	0.012	0.008	0.006	0.013	0.005
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
East×Age	-0.064***	-0.087***	-0.078***	-0.087***	-0.085***	-0.081***
	(0.017)	(0.017)	(0.015)	(0.016)	(0.017)	(0.015)
East×Age^2	0.000	0.005	0.007	0.006	0.005	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Age	0.046***	0.032***	0.025**	0.014	0.010	0.006
	(0.009)	(0.009)	(0.010)	(0.009)	(0.010)	(0.011)
Age^2	-0.003	-0.002	-0.001	-0.001	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
FE (wave, uni, major)	yes	yes	yes	yes	yes	yes
baseline controls	no	yes	yes	yes	yes	yes
idiosyncratic controls	no	yes	yes	yes	yes	yes
Adj. R-Squared	37,419	37,419	37,419	37,419	37,419	37,419
Observations	0.107	0.162	0.193	0.180	0.168	0.207

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1. All specifications include survey year dummies, university dummies, and dummies for the students' majors. Additional control variables are added according to the column headings. A complete list of the related variables is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 8: Student-Fixed Effects Estimation

	Panel A: Full sample	Panel B: Matched on East			Panel C: Matched on East×After90		
	unmatched	all treated	homogenized	trimmed	all treated	homogenized	trimmed
occupational choice	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Eship	-0.855***	-0.848***	-0.853***	-0.855***	-0.841***	-0.815***	-0.820***
	(0.017)	(0.023)	(0.027)	(0.027)	(0.029)	(0.035)	(0.034)
East×Eship	-0.190***	-0.190***	-0.190***	-0.181***	-0.179***	-0.233***	-0.202***
	(0.042)	(0.045)	(0.050)	(0.048)	(0.055)	(0.061)	(0.058)
East×After90×Eship	0.119**	0.124**	0.137**	0.130**	0.110*	0.173**	0.137**
	(0.050)	(0.053)	(0.058)	(0.057)	(0.062)	(0.068)	(0.065)
After90×Eship	0.011	0.006	0.001	0.003	0.000	-0.024	-0.021
	(0.022)	(0.030)	(0.033)	(0.033)	(0.035)	(0.041)	(0.040)
Individual FE	yes	yes	yes	yes	yes	yes	yes
Adj. R-Squared	0.126	0.123	0.122	0.124	0.123	0.116	0.120
Observations	74,754	53,355	47,118	47,147	44,685	38,641	39,938

Notes: Table reports OLS results from difference-in-differences-in-differences regressions according to Equation 3. Column 1 of Panel A reports results for the full, unmatched sample. All other columns report results for subsamples matched on the East-Dummy (Panel B) or the East×After90 interaction dummy (Panel C) by calculating propensity scores and selecting 7 nearest neighbors. Different specifications are defined in the column headings. All specifications include individual level fixed effects. A complete list of the observables used for matching is provided in the Appendix A.1. All standard errors (in parentheses) are clustered on the student level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.